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Factors Affecting the Rate of Alveolar Osteitis following Surgical Extraction of Impacted Third Molars: Review Article

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Abstract: *One of the important postoperative complications following tooth extraction is Alveolar Osteitis (AO). Various risk factors contribute to its development and understanding these risk factors enables the clinicians to reduce the risk of AO or predict its development in certain patients. The aim of the present study was to review various risk factors contribute to the incidence rate of AO following tooth extraction.*
Keywords: *Alveolar Osteitis, Tooth Extraction, Incidence Rate, Mandibular Third Molar, Risk Factor.*

I. Introduction

One of the most common complications after the surgical extraction of the impacted third molars is Alveolar Osteitis (AO). It has been reported that the incidence of AO after the extraction of mandibular third molars is 10 times more than maxillary third molars. The incidence of AO after mandibular third molar surgery varies between 5 to 30 percent in different studies [1-6].

AO starts with a severe and progressive pain 1 to 3 days after the surgery. Although AO is self limiting and vanishes after 5 to 10 days from initiation, it is marked with severe pain and discomfort that affects the patient's quality of life. In addition to pain, patient with AO suffers from halitosis, foul taste, and regional lymphadenitis as well [5]. While the patient experiences various side effects, the surgeon should spend extra amount of time to visit the patient and manage the situation as 45% of patients may require up to 4 additional postoperative appointments [3].

As the risk of developing AO is relatively high in surgical extractions of mandibular third molars, it is very important to understand the risk factors to find the appropriate measures to decrease the risk of developing AO [3]. In this article we will cover the risk factors affecting the incidence of AO and discuss the mechanism by which each factor contributes to the development of AO.

II. Risk Factors Of Developing AO

According to the published articles in the field of oral surgery during the last decades, various risk factors have been recognized to affect the rate of AO following tooth extraction including:

2.1 Type Of Tooth

The rate of developing AO in normal extractions varies between 1 to 4 percent. However, the incidence of AO following surgical extraction of impacted teeth is higher and for mandibular impacted third molars the incidence could reach to 30% [6].

2.2 Site Of Extraction

One of the factors affecting the rate of AO following tooth extraction is the jaw the tooth is extracting from; with mandibular third molars having higher rate of AO in comparison to maxillary third molars [7]. This could be related to the differences in bone structure with highest bone density in the region of mandibular third molars and lowest density in the maxillary third molar site. The higher density of bone leads to lower blood supply which decreases the amount of bleeding in the extraction site. It has been reported that decreased amount of bleeding and lower level of clot contributes to the development of AO [8].

2.3 Eruption Status

Extraction of impacted teeth which is impacted in the alveolar bone leads to higher rate of AO in comparison to the extraction of fully erupted teeth or partially impacted teeth (soft tissue impaction). This is related to the need to remove the alveolar bone covering the impacted tooth and the resultant trauma [9].

2.4 Impaction Level

The impaction level determines the amount of bone surgeon needs to remove during the surgery to expose the tooth and extract it. When the tooth is impacted deep to the ramus and alveolar bone, it requires more

bone to remove and lead to increased amount of trauma during the surgery. Trauma releases tissue factors that increase the fibrinolysis activity and dissolves the formed blood clot. Hence the extraction of an impacted teeth with higher impaction level enhances the incidence of AO [3,6,10].

2.5 Surgeon Experience

Surgeons with higher experience level produce fewer traumas during the surgical extraction of impacted teeth. As a result, the rate of AO following the surgical extraction of impacted teeth is lower with higher experienced surgeons when compared with less experienced surgeons like oral and maxillofacial residents [11].

2.6 Age

There is conflict in the role of age on incidence of AO. The peak of developing AO is the age range of 20 to 40 years old. This could be due to the fact that most of the surgical extractions of impacted teeth is performed at this age range. On the hand older patients has diminished blood supply when compared with younger patients. Hence the chance of developing AO could be higher in older patients [12].

2.7 Gender

The role of gender is also conflicting as some papers indicate higher rate of AO in females and some indicate no significant association between gender and developing AO. The higher incidence of AO in some published articles could be related to the fact that they had no control on the phase of menstrual cycle their female patients were in during the surgery [3,4,6].

2.8 Oral Contraceptive Drugs

Oral contraceptive drugs increase the level of progesterone in the blood circulation to prohibit ovulation. While progesterone increases the fibrinolysis activity within the extraction site, it could enhance the chance of clot dissolution and risk of developing AO [13-16].

2.9 Menstrual Cycle

Eshghpour et al [4] reported that the menstrual cycle has significant effect on the incidence of AO. They found that extraction of impacted third molars during the mid-cycle results in significantly higher rate of AO in comparison to the menstrual period. This is related to the higher levels of progesterone during the ovulation which increases the fibrinolytic activity within the extraction site. The final result would be higher possibility of losing blood clot in the mid-cycle and higher chance of developing AO [4].

2.10 Smoking Habit

Smoking increases the rate of AO after tooth extraction. This increase could be due to the suctioning force produced during smoking that dislodges the clot from its place. In addition, the heat can resolve the blood clot and enhance the chance of developing dry socket or AO [18-21].

2.11 Socket Irrigation

It has been reported that amount of irrigation used to rinse the extraction socket has important role in the rate of AO [22]. Irrigation with sufficient volume of sterile normal saline removes the debris and inflammatory mediators and decreases the level of fibrinolytic activity in the extraction socket [23]. The result is a more stable clot with lower chance of developing AO. Based on the literature, irrigation with 60 ml of sterile normal saline has similar benefits in comparison to higher amount of irrigation [24-26].

2.12 Anesthetic Cartridges

Anesthetic cartridges contain epinephrine to increase their effectiveness. Epinephrine is a vasoconstrictor and limits the amount of bleeding and oxygen tension within the extraction site. The result is higher rate of AO when injecting more than two anesthetic cartridges in comparison to injecting two or one cartridge [27].

III. Conclusion

Based on the present review, it is possible to conclude that the incidence of AO is higher in the surgical extraction of bony impacted mandibular third molars with higher impaction level, in females on their mid-cycle or females which taking oral contraceptive drugs. In addition, the experience of surgeon, patients' smoking habits, amount of socket irrigation after surgery, and number or anesthetic cartridges used to achieve anesthesia have significant effect on the risk of developing AO.

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